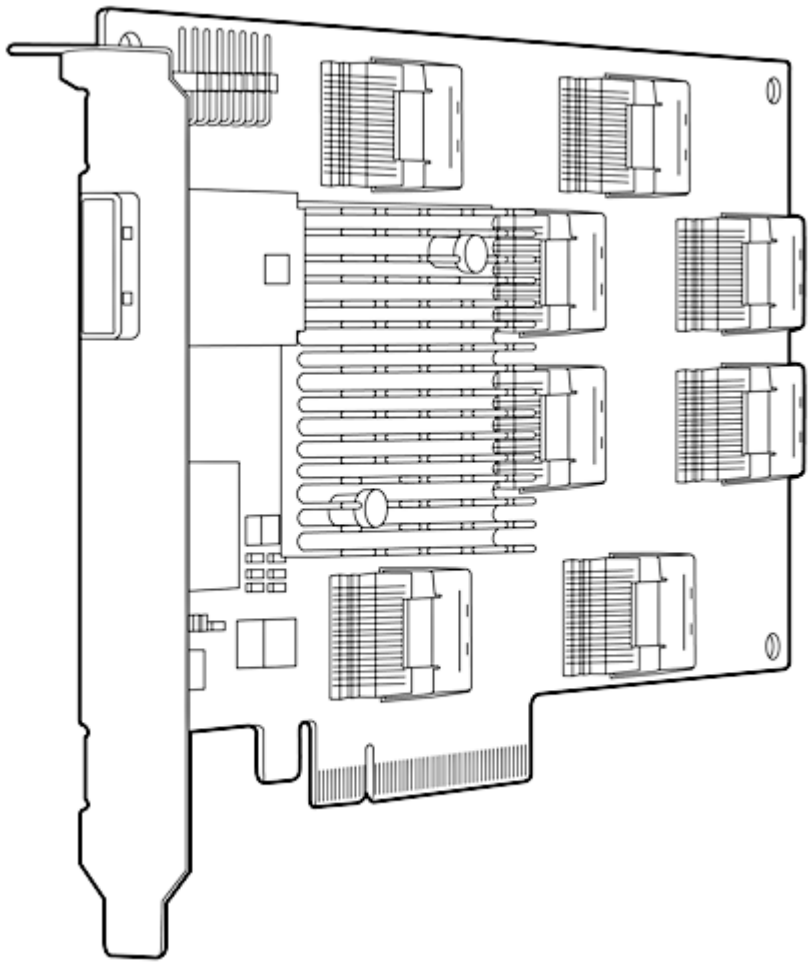
Overview

The HP Smart SAS Expander Card enhances the Smart Array controller family by allowing support for more than 8 internal hard disk drives on select ProLiant servers when connected to a Smart Array P410 Controller (SA-P410) or Smart Array P410i Controller (SA-P410i). The full height, Serial Attached SCSI (SAS) expander card supports up to 24 internal drive bays plus an external connection for tape. The HP SAS Expander Card is ideal for ProLiant server customers that want to RAID more than 8 internal hard disk drives or for ProLiant server customers who purchase an additional internal drive cage and want to be able to RAID across all internal drives.
NOTE: The use of the HP SAS Expander Card requires a minimum of 256MB cache on the SA-P410 or SA-P410i Controller.



Models

HP SAS Expander Card	HP SAS Expander Card	468406-B21

Standard Features

The Smart Array Advantage

HP's innovative design and integration work of the Smart Array family of products, including the HP SAS Expander Card connected to a SA-P410 or SA-P410i Controller creates customer value that is unmatched in the industry. Use of Smart Array products across multiple applications results in a much lower Total Cost of Ownership (TCO) than any other server storage RAID product. The HP Smart Array family brings an unparalleled return on investment through:

Data Compatibility among all models of Smart Array controllers allows simple and easy upgrades any time needs for higher performance, capacity, and availability increase. Even successive generations of Smart Array controllers understand the data format of other Smart Array Controllers.

Consistent Configuration and Management Tools. All Smart Array products utilize a standard set of management and utility software. These tools minimize Total Cost of Ownership (TCO) by reducing training requirements and technical expertise necessary to install and maintain the HP server storage.

Universal Hard Drive form factor is for use across multiple HP servers, disk enclosures and storage systems. With compatibility across many enterprise platforms, you are free to deploy and re-deploy these drives to quickly deliver increased storage capacity, migrate data between systems, and easily manage spare drives.

Pre-Failure Warranty means HP Insight Manager not only reports when a drive is going to fail but allows replacement of failing drives prior to actual failure. For complete details, consult the HP Support Center or refer to your HP Server documentation.

Smart Array Advanced Pack (SAAP) delivers value added software features with the Smart Array Controller, which will further enhance performance, reliability, and availability of customer data.

NOTE: For more information on features and benefits of Smart Array Controllers please visit: www.hp.com/products/smartarray

Key Features

- 6 Gb/s SAS technology delivers high performance and data bandwidth up to 600 MB/s per physical link and contains full compatibility with 3.0Gb/s SAS technology and 1.5 and 3.0Gb/sSATA technology. Mix-and-match SAS and SATA hard drives, lets you deploy drive technology as needed to fit your computing environment.
- Supports up to 24 internal drive bays plus an external connection for tape (supports 3 drive backplanes with each holding 8 drive bays)

Management Features

- Upgradeable firmware via HP firmware CD or http://www.hp.com/cgi-bin/hpsupport/index.pl

Ports

- 24 internal drive bays plus external port for tape
- 8 Mini SAS 4i ports
- 2 Mini SAS 4i ports intended for attachment to the Smart Array controller (e.g. P410 or P410i)
  - 6 Gb/s Gbps SAS bandwidth = 4800 MB/s
- 6 Mini SAS 4i ports intended for attachment to server drive backplanes
  - Supports up to 24 drive bays (3 drive backplanes with each holding 8 drive bays)
- 1 Mini SAS 4x port
  - Intended for attachment to a SAS tape drive, autoloader, or library
  - 6Gb/s SAS bandwidth = 2400 MB/s

Standard Features

Performance

HP's High Performance Architecture sets new boundaries of industry performance expectations!

- 6Gb/s SAS (600MB/s bandwidth per physical link) 3.0Gb/s SATA (300MB/s bandwidth per physical link)

Capacity

Given the increasing need for high performance and rapid capacity expansion, the SAS Expander Card and the SA-P410 or SAP410i Controller offers:

- Up to 14TB of total storage with 14 x 1TB 3.5" SATA MDL HDD
- Up to of 7.2 TB total storage with 24 x 300GB 6Gb/s SAS 10K SFF DP ENT HDD

Fault Recovery

The HP SAS Expander Card helps to minimize downtime.

- Recovery ROM: This feature protects the user from a firmware image corruption by storing a redundant copy of the firmware image. If the active firmware image becomes corrupt, the controller will use the redundant firmware image and continue operating.

Warranty

The warranty for this device is 3-years parts only.

Warranty Upgrade Options

- Response - Upgrade on-site response from next business day to same day 4 hours
- Coverage - Extend hours of coverage from 9 hours x 5 days to 24 hours x 7 days
- Duration - Select duration of coverage for a period of 1, 3, or 5 years
- Warranty upgrade options can come in the form of Care Packs, which are sold at the HP System level this product attaches too

Compatibility

Servers

ProLiant DL (rack-optimized):

- HP ProLiant DL370 G6
- HP ProLiant DL380 G6
- HP ProLiant DL380 G7
- HP ProLiant DL385 G5p
- HP ProLiant DL385 G6
- HP ProLiant DL385 G7
- HP ProLiant DL580 G5
- HP ProLiant DL785 G5
- HP ProLiant DL785 G6

ProLiant ML (expansion-optimized):

- HP ProLiant ML350 G6
- HP ProLiant ML370 G6

NOTE: Customer needs to order 8" Mini SAS to Mini SAS cables (496012-B21) when connecting the Smart Array P410 Controller to a SAS Expander Card in a G6 server or ProLiant DL385 G5p. The 8" Mini Sas To Mini SAS cables are not needed when connected the Smart Array P410i Controller to a SAS Expander Card in a G6 server or ProLiant DL385 G5p.

Operating Systems

Microsoft Windows 2003 x64 Edition
Microsoft Windows 2003 x86 Edition
Microsoft Windows 2008 Server x64
Microsoft Windows 2008 Server x86
Microsoft Window Vista Enterprise
Novell Open Enterprise Server, NetWare 6.5
Oracle Enterprise Linux (OEL)
Red Hat Enterprise Linux 4, 5 (x64 & x86)
SUSE Linux Enterprise Server 9 (x64 & x86)
SUSE Linux Enterprise Server 10 (x64 & x86)
SUSE Linux Enterprise Server 11 (x64 & x86)
VMWare
UnixWare

NOTE: For more Linux OS support & certification information, please visit our the ProLiant & BladeSystem Server Linux matrix: http://h71028.www7.hp.com/enterprise/cache/321146-0-0-0-121.html

Service and Support

HP Care Pack Services: Packaged server and storage services for increased uptime, productivity and ROI

When you buy HP server and storage products and solutions, it's also a good time to think about what levels of support you may need. Our portfolio of service options reduce deployment and management worries while helping you get the most out of your server and storage investments. We take a holistic approach to your environment, bridging servers, blades, storage, software and network infrastructures with our packaged HP Care Pack Services for servers and storage.

Protect your business beyond warranty

When it comes to robustness and reliability, standard computing equipment warranties have matured along with technology. Good news that can also create problems stemming from depending on standard warranties designed to only protect against product defects and some downtime causes. Using a standard approach to warranty uplifts, such as HP Care Pack Services, helps reduce downtime risks and provides operational consistency for mission-critical and standard business computing.

HP Care Pack Services: Upgrading or extending standard server and storage warranties cost effectively

HP Care Pack Services offer a standard reactive hardware and software support services suite sold separately, or combined with our Support Plus and Support Plus 24 services. The portfolio also provides a combination of integrated proactive and reactive services, such as Proactive 24 Service and Critical Service. In addition with HP Proactive Select, you can acquire the specific proactive constancy and technical services. HP Proactive Select menu offers a broad set of service options that you can mix and match depending on your specific requirements. Proactive service options include offers for server, storage, network, SAN device, software, environment and education services.

HP server and storage lifecycle support services offers a full spectrum of customer care-from technology support to complex migrations to complete managed services. HP Factory Express provides customization, integration and deployment services for turnkey solutions. HP Education Services offer flexible, comprehensive training on to help your IT staff get the most out of your server and storage investments. HP Financial solutions extend innovative financing and cost-effective asset management programs-from purchase to equipment retirement.

Learn more: www.hp.com/services/servers and www.hp.com/services/storage

NOTE: Care Pack Services availability may vary by product and country.

HP Care Pack Services are sold by HP and HP Authorized Service Partners:

- Services for customers purchasing from HP or an enterprise reseller are quoted using HP order configuration tools.
- Customers purchasing from a commercial reseller can find HP Care Pack Services at http://www.hp.com/go/lookuptool

Recommended HP Care Pack Services for optimal satisfaction with your HP product

Recommended Services

Hardware Options Support

HP Care Packs provide support for all HP-branded hardware options qualified for inclusion in your server or storage solution. Any additional HP-qualified options installed within the server are covered at the same service level and for the same period as the server and no additional cost.

- Help improve or maintain system uptime
- Convenient onsite support
- Committed response time

http://h20195.www2.hp.com/V2/GetPDF.aspx/5982-6547EEE

3-Year HP Hardware Support Onsite Service, 4-hour response, 24x7

Provides you with rapid remote support and if required an HP authorized representative who will arrive on site any time and day of the year to begin hardware maintenance service within 4 hours of the service request being logged.

This service provides a trained HP service specialist to perform an installation that meets HP quality standards, for:

- Help improve or maintain system uptime
- Convenient onsite support
- Committed response time

http://h20195.www2.hp.com/V2/GetPDF.aspx/5982-6547EEE

HP Installation and Startup of HP ProLiant Servers

Provides for the installation of your new HP ProLiant server and operating system to assist you in bringing your new HP ProLiant server and operating system into operation in a timely and professional manner.

This service provides a trained HP service specialist to perform an installation that meets HP quality standards, for:

- Delivery of the service at a mutually scheduled time convenient to your organization
- Availability of an HP service specialist to answer basic questions during the onsite delivery of this service
- Custom installation as detailed in "Delivery specifications" or in a Statement of Work (SOW)
- Verification prior to installation that all service prerequisites are met

http://h20195.www2.hp.com/V2/GetPDF.aspx/5982?7572ENN

Optional HP Care Pack Services that will enhance your HP product experience

Optional Services

3-Year HP Hardware Support Onsite Call-to-Repair (CTR) Service, 6- or 24-hour
As an alternative to our recommended support level, for customers who need committed call-to-repair for server hardware.

Provides your IT manager with a team of support specialists who will quickly begin troubleshooting the system to help return the hardware to operating condition within 6 or 24 hours of the initial service request to the HP Global Solution Center.

http://h20195.www2.hp.com/V2/GetPDF.aspx/5982-6547EN.pdf

3-Year HP Support Plus 24
As an alternative to our recommended support level, for customers who need access to responsive 24x7 hardware and software support plus software updates on HP and selected third party products:

For a higher return on your server and storage technology, our 3-year combined reactive support service delivers integrated onsite hardware/software support services available 24x7x365, including access to HP technical resources, 4-hour response onsite hardware support and software updates.

http://h20195.www2.hp.com/V2/GetPDF.aspx/5981-6638EEE

HP Proactive Select Service
Customer needs on demand access to consulting, technical proactive services and education courses

Provides a flexible way to purchase HP best-in-class consultancy and technical services. You can buy Proactive Select Service Credits when you purchase your hardware and then use the credits over the next 12 months.

http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA2-3842ENN

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eSupport

HP eSupport is a portfolio of technology-based services that assist you with managing your business environment - from the desktop to the data center.

Support Portal
The HP support portal provides one-stop access to the information, tools and services you need to manage the daily operations of your IT environment.

Features include:

- Access to self-solve tools (including search technical knowledge base)
- Efficient logging and tracking of support cases
- Collaboration with other business and IT professionals
- Download of patches and drivers
- Access to diagnostic tools
- Proactive notification of relevant information

Access to certain features of the support portal requires an HP service agreement. To access the support portal, visit: http://www.hp.com/support

Service and Support

HP Insight Remote Support software delivers secure remote support for your HP Servers and Storage, 24 X 7, so you can spend less time solving problems and more time focused on your business. You can have your systems remotely monitored for hardware failure using secure technology that's been proven at thousands of companies around the world. In many cases, you can avoid problems before they occur.

Customer Technical Training

In today's cost-conscious business environment, IT professionals, developers, consultants and users face an interesting challenge: how to keep up with the latest technologies and expand important skills while delivering profitable results on current projects. To help address this challenge, HP offers innovative training solutions that help keep you up-to-date on virtualization, server, storage, Insight Control, Citrix, Microsoft® and open source/Linux-related topics-while spending less time away from business-critical activities.

HP Services Awards

HP Technology Services continues to be recognized for service and support excellence by customers, partners, industry organizations and publications around the world. Recent honors and award reflect our services team's dedications, technical expertise, professionalism and uncompromising commitment to customer satisfaction.

Additional Services Information

To learn more on HP ProLiant servers, HP BladeSystem servers and HP StorageWorks storage products, please contact your HP sales representative or HP Authorized Channel Partner. Or visit: www.hp.com/services/proliant or www.hp.com/services/bladesystem or http://www.hp.com/hps/storage

Related Options

NOTE: This is a list of supported options. Some may be discontinued.

HP Hard Drives

NOTE: The components of a storage subsystem (e.g. the drive, the HBA/controller, firmware, and the server backplane) should operate at the same data transfer rate or the system bandwidth will be negotiated down to an acceptable level for all components.

NOTE: Hard drives have either a one year or three year warranty; refer to the specific hard drive QuickSpecs for details.

SAS Hot Plug SFF (2.5-inch) Enterprise (ENT) Drives	
HP 600GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	581286-B21
HP 450GB 6G SAS 10K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	581284-B21
HP 300GB 6G SAS 10K SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	507127-B21
HP 300GB 3G SAS 10K SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	492620-B21
HP 146GB 6G SAS 15K SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	512547-B21
HP 146GB 3G SAS 15K SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	504062-B21
HP 146GB 6G SAS 10K SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	507125-B21
HP 146GB 3G SAS 10K SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	418367-B21
HP 146GB 10K rpm Hot Plug SAS 2.5 Single Port Hard Drive	431958-B21
HP 72GB 6G SAS 15K SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	512545-B21
HP 72GB 3G SAS 15K SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	418371-B21
HP 72GB 15K rpm Hot Plug SAS 2.5 Single Port Hard Drive	431935-B21
HP 72GB 10K rpm Hot Plug SAS 2.5 Dual Port Hard Drive	384842-B21
HP 72GB 10K rpm Hot Plug SAS 2.5 Hard Drive	375861-B21
HP 36GB 15K rpm Hot Plug SAS 2.5 Dual Port Hard Drive	418369-B21
HP 36GB 15K rpm Hot Plug SAS 2.5 Single Port Hard Drive	431933-B21
SAS Non-Hot Plug SFF (2.5-inch) Enterprise (ENT) Drives	
HP 300GB 6G SAS 10K SFF (2.5-inch) Non-hot Plug Dual Port ENT 3y Wty Hard Drive	537809-B21
HP 146GB 6G SAS 10K SFF (2.5-inch) Non-hot Plug Dual Port ENT 3y Wty Hard Drive	537807-B21
HP 72GB 6G SAS 15K SFF (2.5-inch) Non-hot Plug Dual Port ENT 3y Wty Hard Drive	537805-B21
SAS Hot Plug LFF (3.5-inch) Enterprise (ENT) Drives	
HP 600GB 6G SAS 15K LFF (3.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	516828-B21
HP 450GB 6G SAS 15K LFF (3.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	516816-B21
HP 450GB 3G SAS 15K LFF (3.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	454232-B21
HP 400GB 10K rpm Hot Plug SAS 3.5 Dual Port Enterprise Hard Drive	459508-B21
HP 300GB 15K rpm Hot Plug SAS 3.5 Single Port Hard Drive	431944-B21
HP 300GB 6G SAS 15K LFF (3.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	516814-B21
HP 300GB 3G SAS 15K LFF (3.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	416127-B21
HP 146GB 15K rpm Hot Plug SAS 3.5 Single Port Hard Drive	375872-B21
HP 146GB 3G SAS 15K LFF (3.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	384854-B21

Related Options

HP 72GB 15K rpm Hot Plug SAS 3.5 Single Port Hard Drive	375870-B21
HP 72GB 15K rpm Hot Plug SAS 3.5 Dual Port Hard Drive	384852-B21
SAS Non-Hot Plug LFF (3.5-inch) Enterprise (ENT) Drives	
HP 600GB 6G SAS 15K LFF (3.5-inch) Non-hot Plug Dual Port ENT 3y Wty Hard Drive	516830-B21
HP 450GB 6G SAS 15K LFF (3.5-inch) Non-hot Plug Dual Port ENT 3y Wty Hard Drive	516826-B21
HP 450GB 3G SAS 15K LFF (3.5-inch) Non-hot Plug Dual Port ENT 3y Wty Hard Drive	454234-B21
HP 400GB 10K rpm Non Hot Plug SAS 3.5 Dual Port Enterprise Hard Drive	508232-B21
HP 300GB 6G SAS 15K LFF (3.5-inch) Non-hot Plug Dual Port ENT 3y Wty Hard Drive	516824-B21
HP 300GB 3G SAS 15K LFF (3.5-inch) Non-hot Plug Dual Port ENT 3y Wty Hard Drive	417950-B21
HP 300GB 3G SAS 15K NHP 3.5" SP HDD	431950-B21
HP 146GB 3G SAS 15K LFF (3.5-inch) Non-hot Plug Dual Port ENT 3y Wty Hard Drive	417855-B21
HP 146GB 15K rpm Non Hot Plug SAS 3.5 Single Port Hard Drive	432093-B21
HP 72GB 15K rpm Non Hot Plug SAS 3.5 Single Port Hard Drive	432095-B21
SAS Hot Plug SFF (2.5-inch) Midline (MDL) Drives	
HP 500GB 6G SAS 7.2K rpm SFF (2.5inch) Midline 1yr Warranty Hard Drive	507610-B21
SAS Hot Plug LFF (3.5-inch) Midline (MDL) Drives	
HP 2TB 6G SAS 7.2K rpm LFF (3.5-inch) Dual Port Midline 1yr Warranty Hard Drive	507616-B21
HP 1TB 6G SAS 7.2K rpm LFF (3.5-inch) Dual Port Midline 1yr Warranty Hard Drive	507614-B21
HP 1TB 3G SAS 7.2K rpm LFF(3.5-inch) Dual Port Midline 1yr Warranty Hard Drive	461137-B21
HP 750GB 3G SAS 7.2K rpm LFF(3.5-inch) Dual Port Midline 1yr Warranty Hard Drive	461135-B21
SATA Hot Plug SFF (2.5-inch) Midline (MDL) Drives	
HP 500GB 3G SATA 7.2K rpm SFF (2.5-inch) Midline 1yr Warranty Hard Drive	507750-B21
HP 160GB 3G SATA 7.2K rpm SFF (2.5-inch) Midline 1yr Warranty Hard Drive	530888-B21
SATA Non-Hot Plug SFF (2.5-inch) Midline (MDL) Drives	
HP 500GB 3G SATA 7.2K rpm SFF (2.5-inch) Non-hot Plug Midline 1y Wty Hard Drive	507753-B21
HP 160GB 3G SATA 7.2K rpm SFF (2.5-inch) Non-hot Plug Midline 1y Wty Hard Drive	530891-B21
SATA Hot Plug LFF (3.5-inch) Midline (MDL) Drives	
HP 2TB 3G SATA 7.2K rpm LFF (3.5-inch) Midline 1yr Warranty Hard Drive	507632-B21
HP 1TB 3G SATA 7.2K rpm LFF (3.5-inch) Midline 1yr Warranty Hard Drive	454146-B21
HP 750GB 3G SATA 7.2K rpm LFF (3.5-inch) Midline 1yr Warranty Hard Drive	458930-B21
HP 500GB 3G SATA 7.2K rpm LFF (3.5-inch) Midline 1yr Warranty Hard Drive	458928-B21
HP 250GB 3G SATA 7.2K rpm LFF (3.5-inch) Midline 1yr Warranty Hard Drive	458926-B21
SATA Non-Hot Plug LFF (3.5-inch) Midline (MDL) Drives	
HP 2TB 3G SATA 7.2K rpm LFF (3.5-inch) Non-hot Plug Midline 1y Wty Hard Drive	507774-B21

Related Options

HP 1TB 3G SATA 7.2K rpm LFF (3.5-inch) Non-hot Plug Midline 1y Wty Hard Drive	507772-B21
HP 750GB 3G SATA 7.2K rpm LFF (3.5-inch) Non-hot Plug Midline 1y Wty Hard Drive	462595-B21
HP 500GB 3G SATA 7.2K rpm LFF (3.5-inch) Non-hot Plug Midline 1y Wty Hard Drive	458941-B21
HP 250GB 3G SATA 7.2K rpm LFF (3.5-inch) Non-hot Plug Midline 1y Wty Hard Drive	458939-B21
SATA Hot Plug SFF (2.5-inch) Entry (ETY) Drives	
HP 250GB 3G SATA 5.4K rpm SFF (2.5-inch) Entry 1yr Warranty Hard Drive	460355-B21
HP 120GB 1.5G SATA 5.4K rpm SFF (2.5-inch) Entry 1yr Warranty Hard Drive	458924-B21
SATA Non-Hot Plug SFF (2.5-inch) Entry (ETY) Drives	
HP 250GB 3G SATA 5.4K rpm SFF (2.5-inch) Non-hot Plug Entry 1y Wty Hard Drive	460357-B21
HP 120GB 1.5G SATA 5.4K rpm SFF (2.5-inch) Non-hot Plug Entry 1y Wty Hard Drive	459357-B21
SATA Hot Plug LFF (3.5-inch) Entry (ETY) Drives	
HP 250GB 3G SATA 7.2K rpm LFF (3.5-inch) Entry 1yr Warranty Hard Drive	571230-B21
HP 160GB 3G SATA 7.2K rpm LFF (3.5-inch) Entry 1yr Warranty Hard Drive	458945-B21
SATA Non-Hot Plug LFF (3.5-inch) Entry (ETY) Drives	
HP 250GB 3G SATA 7.2K rpm LFF (3.5-inch) Non-hot Plug Entry 1y Wty Hard Drive	571232-B21
HP 160GB 3G SATA 7.2K rpm LFF (3.5-inch) Non-hot Plug Entry 1y Wty Hard Drive	458947-B21

NOTE: Go to the HP Hard Drive Compatibility table for complete drive compatibility information (http://www.hp.com/products/harddiskdrives). Using hard drives in unsupported configurations will result in voiding the warranty and could result in damage to the drive and/or loss of data.

NOTE: There is a known compatibility issue with some early 3.5" SATA HDD that will make them unable to be used with the SA-P400 controller. Customers should verify that they are not using hard drive part number 332649-002/003 (spare 353042-001), 332650-002/003 (spare 353043-001), or 356536-002/003 (spare 353044-001).

NOTE: SATA Drive Write Cache is disabled by default to minimize the risk of data loss in case of power loss and cannot be enabled for SATA drives attached to all HP Smart Array controllers and HP 8 Port internal SAS/SATA HBA with RAID.

Related Options

HP Tape Storage	SAS Tape Drives	
	HP StorageWorks LTO-2 Ultrium 448 SAS External Tape Drive	DW086A
	HP StorageWorks LTO-3 Ultrium 920 SAS External Tape Drive	EH848A
	HP StorageWorks 1U SAS Rack-mount kit with one LTO-4 Ultrium 1760	EH946A
	HP StorageWorks LTO-4 Ultrium 1840 SAS External Tape Drive	EH861A
	Rack-mount Tape Drive Enclosures	
	HP StorageWorks 1U SAS Rack-Mount Kit NOTE: The 1U SAS Rack-Mount Kit can support up to (2) half-height tape drives and is compatible with the DAT 160 SAS, LTO-2 Ultrium 448 SAS, LTO-3 Ultrium 920 SAS and LTO-4 Ultrium 1760 SAS tape drives.	AE459A
	HP StorageWorks 3U SAS Rack-mount Kit NOTE: The 3U Rack-mount Kit can support up to (2) full-height or (4) half-height tape drives and compatible with multiple SAS tape drives including DAT 160 SAS, LTO-2 Ultrium 448 SAS, LTO-3 Ultrium 920 SAS, LTO-4 Ultrium 1760 SAS and LTO-4 Ultrium 1840 SAS tape drives.	AG576A
	Tape Autoloaders	
	HP StorageWorks 1/8 G2 LTO-4 Ultrium 1760 SAS Autoloader	AK377A
	HP StorageWorks 1/8 G2 LTO-3 Ultrium 920 SAS Autoloader	AH558A
	Tape Libraries	
	HP StorageWorks MSL2024 1 LTO-4 Ultrium 1760 SAS Drive Library	AK378A
	HP StorageWorks MSL2024 1 LTO-3 Ultrium 920 SAS Drive Library	AH559A
	HP StorageWorks MSL4048 1 LTO-4 Ultrium 1760 SAS Drive Library	AK380A
	HP StorageWorks MSL4048 1 LTO-3 Ultrium 920 SAS Drive Library	AH560A
	HP StorageWorks MSL8096 2 LTO-4 Ultrium 1760 SAS Drive Library	AK382A
	HP StorageWorks MSL8096 2 LTO-3 Ultrium 920 SAS Drive Library	AH561A
	SAS Cables for Tape Drives and Automation	
	2 meter external Mini-SAS (SFF8088) to Mini-SAS (SFF8088) 1x SAS cable NOTE: Use this cable to connect HP StorageWorks SAS external tape devices to HP SAS controllers with external Mini-SAS (SFF8088) connectors.	AE470A
	4 meter external Mini-SAS (SFF8088) to Mini-SAS (SFF8088) 1x SAS cable NOTE: Use this cable to connect HP StorageWorks SAS external tape devices to HP SAS controllers with external Mini-SAS (SFF8088) connectors.	AE465A
	2 meter external mini-SAS (SFF8088), split to 4x mini-SAS (SFF8088) cable NOTE: One cable is required for every four drives. Use this cable to connect HP StorageWorks MSL SAS Tape Libraries to Mini-SAS (SFF8088) ports.	AN975A
	4 meter external mini-SAS (SFF8088), split to 4x mini-SAS (SFF8088) cable NOTE: One cable is required for every four drives. Use this cable to connect HP StorageWorks MSL SAS Tape Libraries to Mini-SAS (SFF8088) ports.	AN976A

HP Cable Options	SAS to Mini SAS Cables	
	Mini-SAS to Mini-SAS, 8.00"	496012-B21
	Mini-SAS to Mini-SAS, 25.50" & 28.00"	496013-B21
	Mini-SAS to Mini-SAS, 33.00"	496014-B21

Technical Specifications

Dimensions	PCIe full-height card	
	Not including bracket	6.6 in x 4.376 in (167.65 mm x 111.15 mm)
	Including bracket	12.283 in x 4.376 in (312 mm x 111.15 mm)
Disk Drive Transfer rate	6Gb/s SAS (Serial Attached SCSI)	
	3.0Gb/s SATA (Serial ATA)	
SAS Connectors	8 Mini SAS 4i connectors (2 connecting to controller and up to 6 connectors to attach 3 drive cages)	
	1 Mini SAS 4x connector (for tape attach)	
SAS Speed	If attached via 2 cables to a Smart Array P410 Controller or Smart Array P410i Controller the total available bandwidth is 4.8GB/s.	
	If attached via 1 cable to a Smart Array P410 Controller or Smart Array P410i Controller the total available bandwidth is 2.4GB/s.	
Logical Drives Supported	Up to 64 logical drives when connected to a Smart Array P410 Controller or Smart Array P410i Controller.	
Maximum Logical Drive Capacity	14 TB using 14, 1TB SATA drives in RAID 0	
Upgradeable Firmware	NOTE: Via Smart Array P410 Controller or Smart Array P410i Controller.	
	Upgradeable Firmware via HP Firmware CD or http://www.hp.com/cgi-bin/hpsupport/index.pl	

Environment-friendly Products and Approach	**End-of-life Management and Recycling**	Hewlett-Packard offers end-of-life HP product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to: http://www.hp.com/go/green. To recycle your product, please go to: http://www.hp.com/go/green or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner. The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: http://www.hp.com/go/green. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

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For hard drives, 1GB = 1 billion bytes. Actual formatted capacity is less.